INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 2004	**Park:** Shenandoah NP
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Permit#:
SHEN-2004-SCI-0004

Park-assigned Study Id. #:
SHEN-00038

Project Title:
Shenandoah Watershed Study (SWAS)

Permit Start Date: Jan 01, 2004	**Permit Expiration Date** Dec 31, 2009
Study Start Date: Jan 01, 1990	**Study End Date** Dec 31, 2055

Study Status:
Continuing

Activity Type:
Research

Subject/Discipline:
Watershed Management / Assessment

Objectives:

The Shenandoah Watershed Study (SWAS) has both scientific and practical resource-management objectives. The underlying scientific objective of the SWAS program has been to improve understanding of hydro-biogeochemical processes and factors that govern ecosystem conditions in SNP's mountain watersheds. This scientific objective complements a resource management objective that has been defined by the need to document and assess change that is occurring in SNP's ecosystems.

Findings and Status:

This was the 25th year of watershed monitoring conducted in SNP by the SWAS program. The monitoring framework currently includes 14 study watersheds selected to represent the major bedrock types in SNP. Data collection includes quarterly, weekly and hourly sample collection for analysis of stream water composition, discharge gauging, and collection and analysis of precipitation.

The results of trend analysis for SNP study streams for 1988-2003, including results for regional trend analysis based on quarterly sampling data, as well as results for trend analysis for individual streams based on both quarterly and weekly sampling data, are indeterminate with respect to recovery from stream acidification due to atmospheric deposition. In general, there were significant increasing trends in ANC, but sulfate concentrations were generally not decreasing and in many cases sulfate concentrations were increasing. Other factors, including trends in discharge and watershed defoliation by gypsy moth larva, have contributed to the observed decrease in stream water acidity (or increased ANC) and complicated the attribution of recovery. A decreasing trend in discharge during the 1988-2003 period contributed to decreasing concentrations of sulfate and increasing concentrations of base-cations and ANC. Trend analysis based on flow-adjusted data provide less evidence for recovery from acidification in general and less evidence for recovery from acidification due to atmospheric deposition in particular. The gypsy moth defoliation of study stream watersheds during the late 1980s and early 1990s contributed to a transient pulse in nitrate concentrations, as well as alteration of sulfate and base-cation concentrations. Changes in nitrate concentration were generally greater than those of sulfate and may account for much of the observed change in acid

anions.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?

No

Funding provided this reporting year by NPS:	**Funding provided this reporting year by other sources:**
71500	0

Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college

Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
University of Virginia	71500